

# THE FRENCH REVOLUTION

## *Assembleur™ Luthiers Clamps*

Designed by a French nuclear scientist, these violin makers clamps feature feather-weight lexan jaws, rigid carbon fiber shafts, and special soft protective pads. The jaws can apply considerable force, or delicate pressure. Their clever, ergonomic design provides quick and precise tactile adjustment, as well as instantaneous release.

Used as fixed single jaw bench clamps or as conventional sliding double jaw clamps, a myriad of uses can be found for these well-engineered, and surprisingly affordable tools.

*Photo: No. PSWI001 master clamp, PSJ0012 mini clamp.*



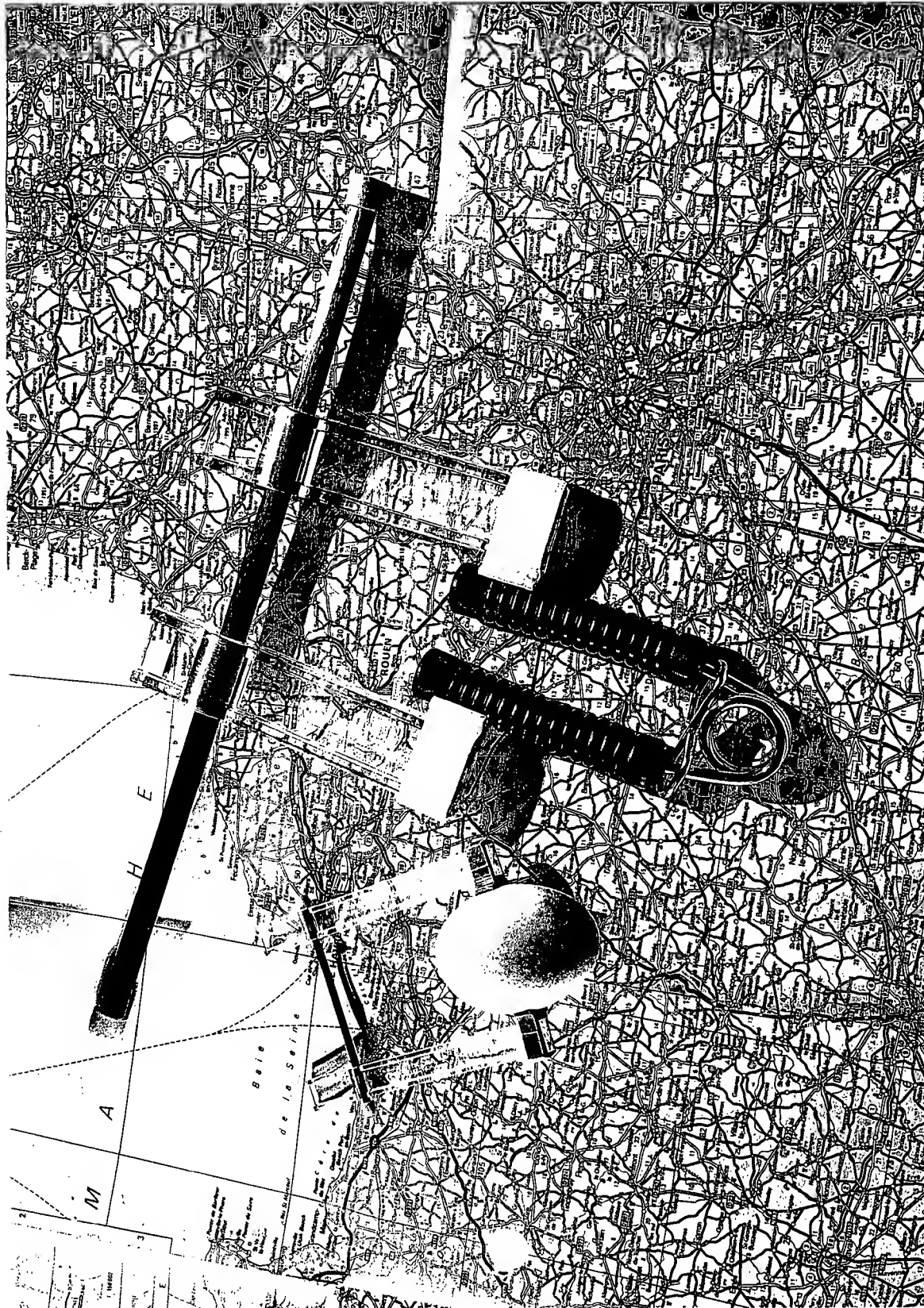
*Knilling*

1400 Ferguson Avenue • St. Louis, MO 63133

*Knilling carries a complete line of string instruments, accessories, educator aids, and makers tools and supplies. Quality cases and covers by Winter, VGV, Embassy, TKL, Freistat, SKB, Artistic. Excellent student and master bows by Glasser, K. Mueller, Alfred Knoll, Lohar Seifert.*

Exhibit # 1

For more information or to order, contact Knilling,  
1.800.727.4512 or fax 314.727.8929.



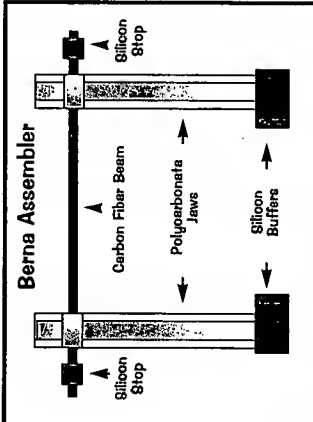
## What are Berna Assemblers?

Berna Assemblers are truly unique clamps. They come in a full range of sizes that allow you to tackle the smallest and most fragile clamping task up to the largest assembly project.

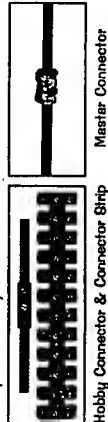
- No other clamps on the market offer as secure a fit, simple and lightweight a design, and ease of use.
- Developed in France by Dr. Berna, the Assemblers come in two size categories - "Hobby" and "Master".

### Berna Assemblers consist of:

- **A Beam** - made of high density carbon fiber for strength and durability.
- **Two Jaws** - made of polycarbonate. Both Jaws have complete freedom of movement along the beam. Can be reversed when clamp is used as a spreading tool.
- **Two Buffers** - made of soft silicone rubber that prevent damage to fragile objects and conform to unusual shapes.
- **Two Stops** - made of silicone rubber that keep the jaws from sliding off the beam.



Two beams can be joined to increase jaw capacity using special Hobby & Master Connectors shown below.



## Hobby Clamps

- Ideal for small or fragile clamping projects where up to 11 lbs. of force is adequate.
- Available in two sizes:
  - 3" (76mm) beam with 3" jaws (P/N 38-710).
  - 8" (200mm) beam with 3" jaws (P/N 38-720).
- Beams are 1/8" (3.17mm) thick.
- Clamps weigh less than .5 oz. (12 grs.).

**Applications:**  
model building, crafts, doll house furniture assembly, miniatures, small picture frame assembly, repair of porcelain and china pieces.

## Master Clamps

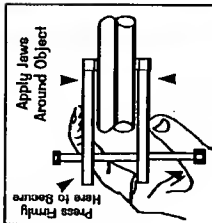
- Use for larger scale assembly projects that require up to 200 lbs. of force.
- Available in six sizes:
  - 13" (330mm) beam with 4" (102mm) jaws (P/N 38-810).
  - 13" beam with 6" (152mm) jaws (P/N 38-820).
  - 19" (483mm) beam with 4" jaws (P/N 38-830).
  - 19" beam with 6" jaws (P/N 38-840).
  - 29" (737mm) beam with 4" jaws (P/N 38-825).
  - 29" beam with 6" jaws (P/N 38-845).
- Beams are 3/8" (9.525mm) thick.
- Clamps weigh 4 ozs. (113 grs.).

**Applications:**  
home repairs, assembly of larger models, dollhouses and other kits, woodworking projects, repair & restoration of antique furniture, sculpture, and as a jig for brazing, painting, and soldering.

## Using Berna Assemblers

**Applying:**

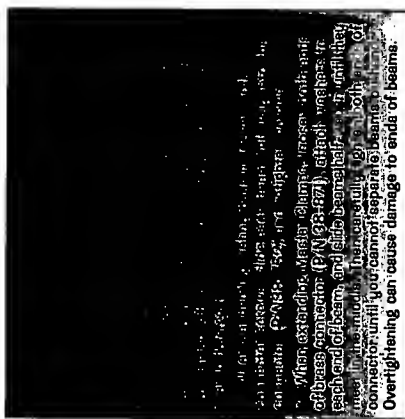
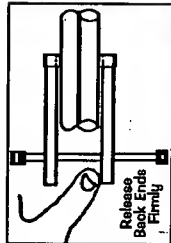
- Hobby size clamps are simple to apply using either one or two hands, the master sizes require two hands.



- Steady the object and slide the jaws together to align around the clamping area.
- Press the back ends of the jaws towards the center making sure that they remain parallel.
- Apply necessary pressure - up to 11 lbs. of force for the hobby sizes (they are made to twist off if too much force is applied). The master sizes can withstand up to 200 lbs. of force (they will not twist off when too much force is applied).
- The force exerted by the fingertips is about the same as between the buffers.
- The jaws can clamp almost any form or unusual shape since their buffers are flexible enough to fit most contours.

**Quick Release:**

- The clamps are easy to remove by sliding the back ends of the jaws firmly apart..



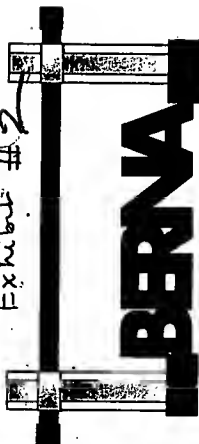
Ask your Hobby Retailer about Berna Assemblers and other products from ZONA.

**ZONA TOOL COMPANY**  
16 Stony Hill Rd., Bethel, CT 06801

Form 511 1/87

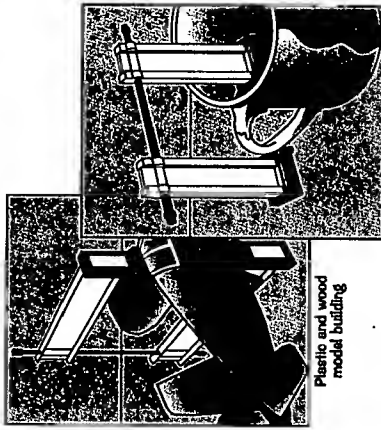
Printed in U.S.A.

Exhibit #2



**BERNA**  
ASSEMBLERS®

**The Perfect  
Clamping System  
for Every  
Hobby Project**



Plastic and wood  
model building

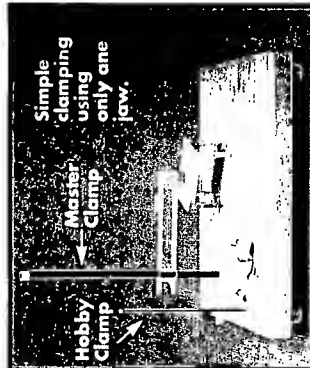
Distributed Exclusively By

**ZONA**

The choice of model makers and  
craftsmen for over 50 years.

# ZONA's BERNA ASSEMBLERS:

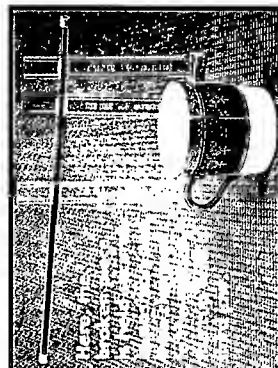
## The Most Unique and Versatile Clamping System for Gluing and Assembly Projects



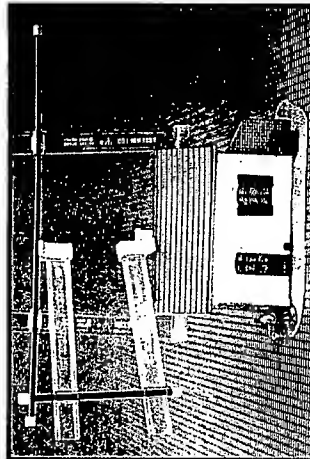
Use as a simple hold down tool with just one jaw and a pilot hole in your workbench.



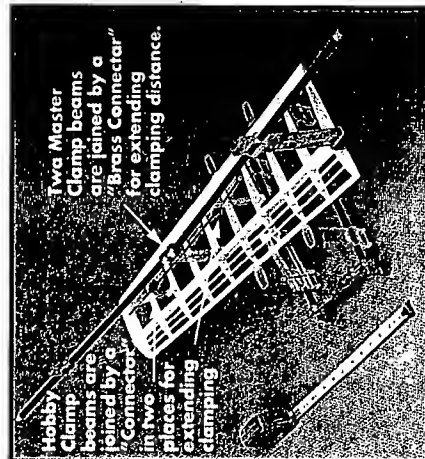
Reverse the buffers and use your clamp as a spreading tool.



Add a third jaw onto the beam for greater clamping versatility.



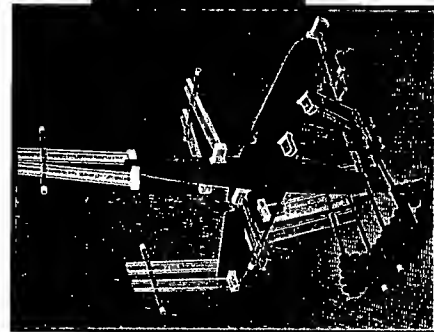
Use multiple clamps for increased strength and holding power. Also to press on hard-to-reach surfaces of parts being assembled.



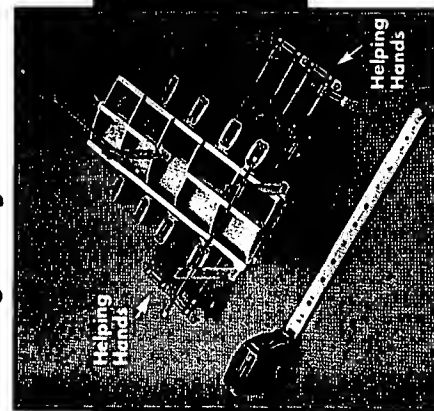
Hobby and master size clamps work well together for projects with varying size parts.

Beams can be extended up to three times in length without losing strength and holding power.

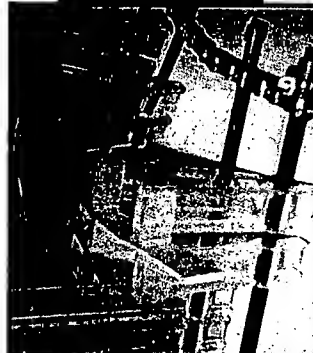
For Hobby size clamps, use "Connectors" (P/N 38-752; individual or P/N 38-751-strip of 12)  
For Master size clamps use "Brass Connectors" (P/N 38-871).



Using Clamps as Jigs.



Clamps can also be used as jigs to hold workpieces securely in place. On the left, Hobby Clamps are held together with "Connectors" to create a jig for this plastic model plane. On the right, Master Clamps are held together with "Helping Hands" (P/N 38-873) to form a jig to hold the wood wing in place. You can also use them in this manner for soldering and brazing work or spray painting.

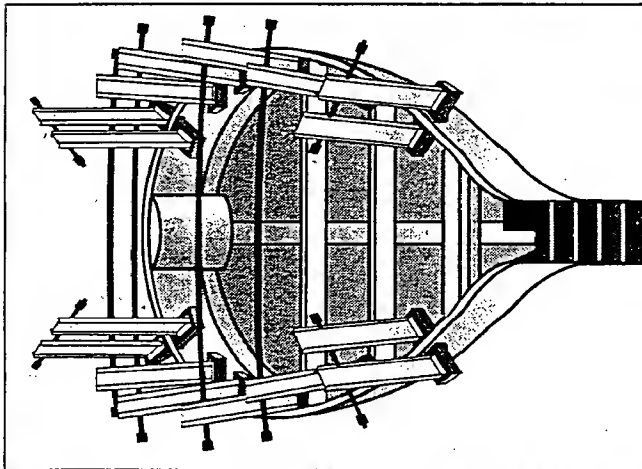


Conforming to Unusual Shapes (Ideal for Boat Assembly)

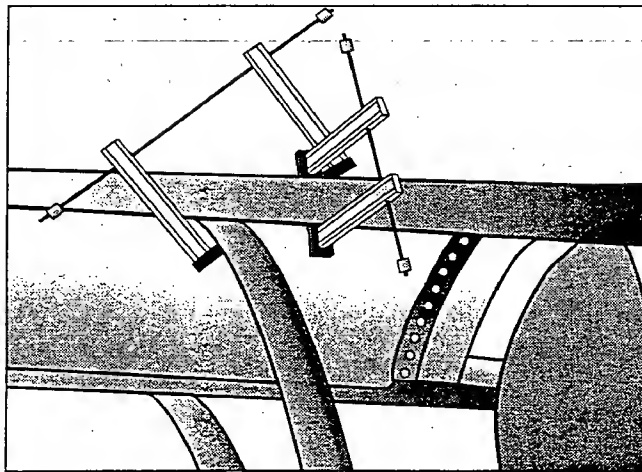


Here are two more examples of the incredible versatility of Berna Assemblers. The photo on the left shows how easily material can be made to bend by positioning sets of jaws within a jig. Clamping odd or unusual shapes is another very important feature illustrated in the photo on the right.

# BERNA ASSEMBLERS



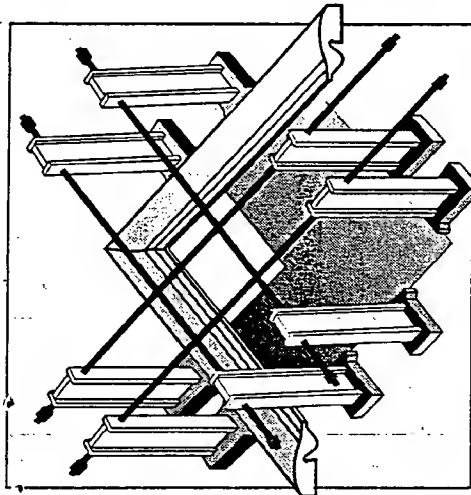
Can be used for internal clamping/holding apart by reversing the jaws



Clamping against a second assembler enables the holding of objects with awkward angles

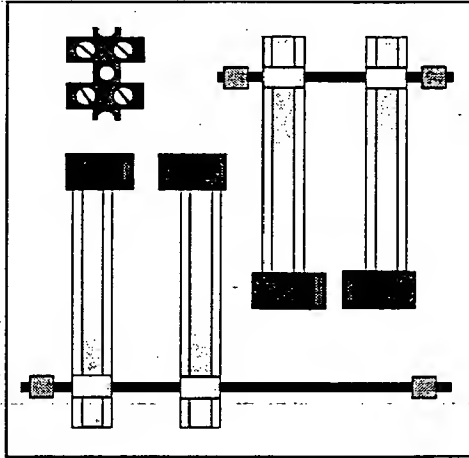
Unlike traditional clamps, Berna Assemblers form a versatile clamping system that can be used on delicate objects. They are the answer to the prayers of Model Makers, Restorers and Craftsmen.

The beauty of the Berna Assembler is that it can be set up single-handed, leaving the other hand free to steady the object being worked on. Its rubber buffers at the end of the jaws provide an elastic pressure and a reliable reproduction of human force. This means that for the first time in history you now have complete control over the clamping force, unlike with traditional clamps where the force is determined by the thread of the screw.



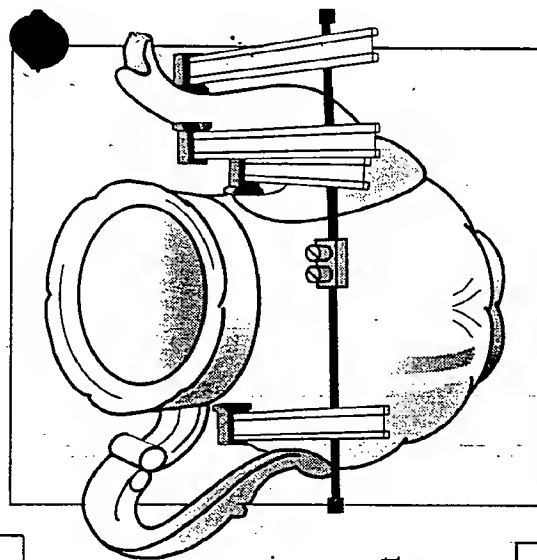
The flexible action of Berna Assemblers allows final adjustments before gluing

The Assemblers are made up of a pair of Polycarbonate jaws which run along a toughened Carbon Fibre rod, the same material used in helicopter propeller shafts. The rubber buffers fitted to the jaws are flexible enough to fit most contours. The jaws themselves are reversible, so that the Assembler can be used as a spreading tool.



The range includes a set of 3 short or 2 long assemblers in both Professional and Hobby versions

Furthermore the Assemblers can be extended using the connectors supplied. These strong, but lightweight assemblers are a 'clamping system'. You can use as few or as many as you need depending on the simplicity or complexity of the job in hand. Whatever the external shape of your workpieces, the Berna Assemblers will hold them together elastically and without damage.

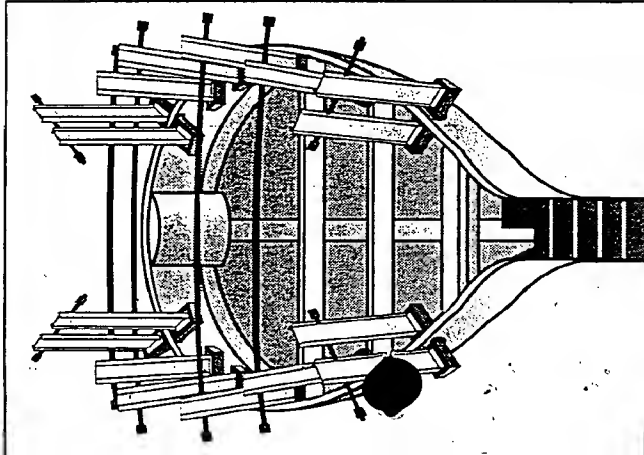


Rods can be extended using the connectors supplied and still provide constant elastic pressure

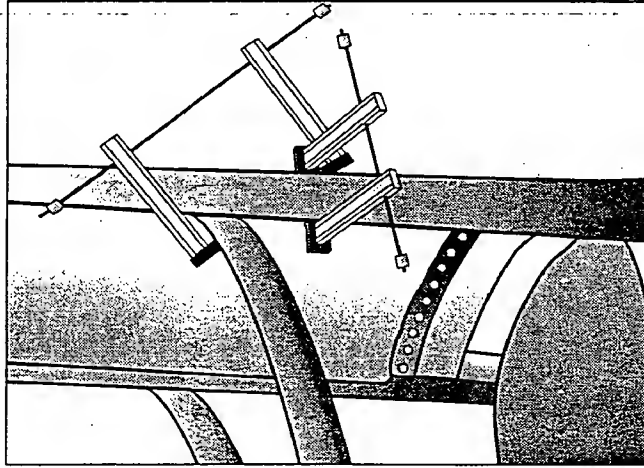
Available in both Professional and Hobby versions, these innovative assemblers are being used by the restoration teams of world famous museums such as the British Museum in London, the Louvre in Paris, the Metropolitan Museum of Art in New York and many others. They are also extensively used by modellers, craftsmen and householders for a variety of clamping and assembling tasks.



# BERNA ASSEMBLERS



Can be used for internal clamping/holding apart by reversing the jaws

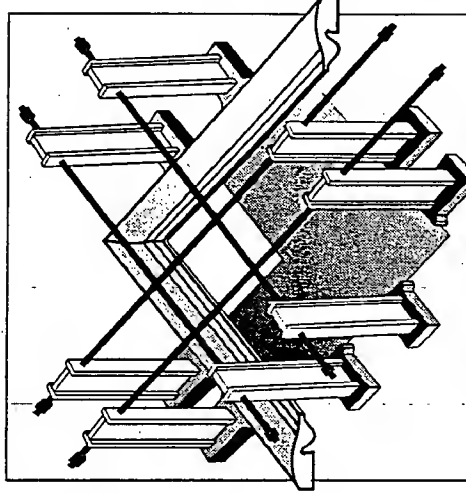


Clamping against a second assembler enables the holding of objects with awkward angles

Unlike traditional clamps,

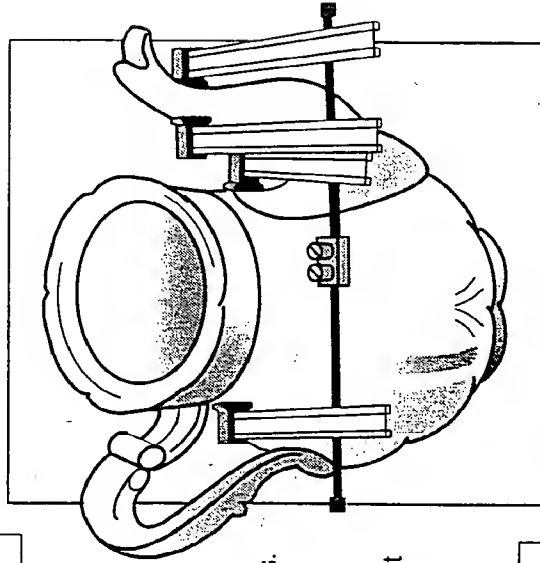
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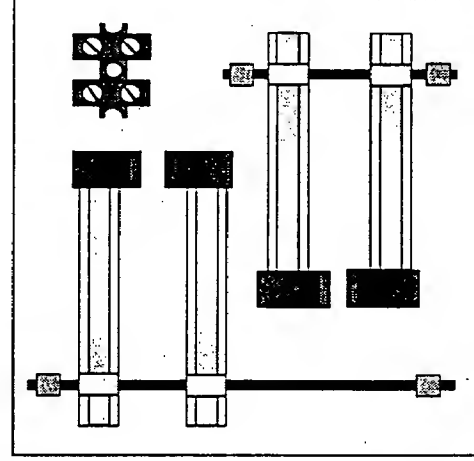
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# **FOREDOM**

**The Foredom Electric Company**

16 Stony Hill Road, Bethel, CT 06801-1039 \* Telephone: 203-792-8622

Fax: 203-790-9832

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**TO: Shesto**

**Fax: Shesto**

**ATTN: Richard**

**FROM: Mark Comen**

**DATE: January 25, 1994**

**SUBJECT: Berna Assemblers**

**Dear Richard:**

I hope you had a nice vacation! I just returned from the HIA Show in Las Vegas. The clamps were the hit of the Show! Just about everyone who shopped by the booth thought they were great. Some were interested in bulk purchases with no packaging, others were interested in sets with packaging. I think I could have sold close to 1000 units at the Show. One instructor was interested in buying 500 to sell to her students. I am wondering about the possibility of Shesto and Foredom becoming the U.S. distributor in the Hobby Market.

The #1 Miniature Doll House Show is in February and would only be worth going to if we had the clamps. I believe we have a winner here and would like to jump on this opportunity. We would have an exclusive. The price did not seem to bother anyone in the craft industry. The HIA Model Show is in October. If we do get them I would like a copy of all those photos. Maybe the inventor or you would like to come to the U.S. Show in October and do a demonstration similar to the one you did in London.

Link 51 (Storage Products)  
Limited,  
Link House Halesfield 6,  
Telford,  
Shropshire.  
TF7 4LN

National Association of  
Teachers of Home Economics  
and Technology,  
Hamilton House,  
Mabledon Place,  
London.  
WC1H 9BJ

Nick Capstick,  
Manufacturing By Design,  
National Council for  
Educational Technology,  
Milburn Hill Rd,  
Science Park,  
Coventry.  
CV4 7JJ

RSA Examinations Board,  
Westwood Business Park,  
Coventry.  
CV4 8HS

Shesto Limited,  
Unit 2 Sapcote Trading Centre,  
374 High Rd,  
Willesdon,  
London.  
NW10 2DH

Techsoft (UK) Ltd,  
Old School Lane,  
Erryrys Mold,  
Clwyd.  
CH7 4DA

Testbed Technology Limited,  
The Science Park,  
Hutton Street,  
Blackburn.  
BB1 3BY

materials from steel to plastic, from polythene to textiles. The Kit allowed testing to be performed on tensile strength, compression, shearing, bending and hardness with two electric meters indicating the results on a mains driven amplifier unit.

Art materials were much in evidence; the Berol stand was presenting a new range of acrylic paints which had two characteristics, one was that they were shinier than ever before, the second was that by mixing with a fabric medium fluid (also on offer) they could be used effectively for fabric printing.

On the Kuretake stand the Posterman colour markers were evoking a good deal of interest; these poster markers were in use to make designs on ceramic and plastic objects which had a fair degree of permanency and, according to many teachers, a good deal of pupil acceptability.

An attractive innovation on the ESA McIntosh stand were the new low voltage outlets which could be slotted into any proprietary trunking system in schools and which delivered safe, low voltage supplies available in any part of the system. Each outlet, consisting of a 2 gang blanking plate, is pre-assembled with its own transformer and capable of delivering variable low voltage from 1.5 volt to 15 volts at 500 mA.

But the prize for the simplest and neatest design on offer in the whole show must go to Berna Assemblers, their new and astonishingly simple system for clamping fragile objects of any shape and form which will be a boon to every student and teacher who needs an extra pair of hands or even an extra set of fingers. The Assemblers are a pair of polycarbonate jaws. The rubber buffers fitted to the jaws are flexible enough to fit most contours. The jaws are reversible so the Assembler can also be used as a spreading tool. Devised by a French Professor of Physics the Assemblers are distributed by Shesto Limited.

As one talked to the enthusiastic salesmen and manufacturers of this plethora of new, clever ideas, a recurring question arose. Have they all been created in accordance with the same National Curriculum recommended design and make procedures that the teachers examining them are expected to adopt? Alas the answer, in most cases, was no. The origins of most products were much more spasmodic — bright ideas in the bath, ruminations on the back of an envelope or simply the realisation that there was a gap in one's catalogue or that one's competitors had tapped a winning line that one's own company should immediately emulate. The true course of rational design was almost everywhere augmented by a mixture of gut feelings, imitation, exploitation and sheer crude opportunism.

SHESTO EXHIBITED AT THE DESIGN & TECHNOLOGY EXHIBITION  
IN NOV '93. THIS ARTICLE HAS JUST BEEN PUBLISHED IN THE  
JOURNAL OF THE DESIGN & TECHNOLOGY ASSOCIATION (VOL. 26 / 2)



Exhibit # 6  
**ACADEMIE DU BRICOLAGE**  
**ET DU JARDINAGE**

## **TROPHÉES 1991**

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Les **Trophées de l'ACADEMIE du BRICOLAGE et du JARDINAGE** sanctionnent une invention, un procédé ou un produit apportant des innovations dans le domaine exclusif du bricolage et du jardinage et saluent la contribution des personnes physiques ou morales au développement du marché.

Réuni autour du Président du CLIB, M. Lionel MADIER, le **Jury de l'ACADEMIE du BRICOLAGE et du JARDINAGE** s'est réuni le Jeudi 16 Mai 1991 afin de procéder à la désignation de ses premiers Trophées.

Après une première sélection au cours de laquelle 19 dossiers ont été retenus, le Jury a désigné, après vote à bulletin secret :

- *Lauréat du premier Trophée de l'Innovation : catégorie "Invention" :*  
M. Philippe BERNA, pour son serre-joint  $\Psi$ .

Ce système ultra-léger permet de renforcer les assemblages dans les domaines des travaux de loisir et de bricolage léger.

Le serre-joint  $\Psi$ , équipé d'une tige support en fibres de carbone, n'abîme pas les objets enserrés et offre une ouverture maximale de 220 mm et une allonge de 74 mm.

- *Lauréat du premier Trophée de l'Innovation : catégorie "Nouveaux Produits Bricolage" :*  
la Société DIAGRAL pour son système d'alarme radio sans fils.

Le système de sécurité DIAGRAL, concept d'alarme radio sans fil adaptable partout, permet l'équipement d'une habitation selon les besoins spécifiques exprimés par les utilisateurs. D'une utilisation simple, d'une sécurité absolue (insensible aux coupures de courant ...), d'une grande simplicité de pose, le système DIAGRAL peut à tout moment être complété.

- *Lauréat du premier Trophée de l'Innovation : catégorie "Nouveaux Produits Jardinage" :*  
la Société BOSCH pour son système d'arrosage intelligent AIR 500.

L'arroseur AIR 500 de BOSCH combine les effets des arroseurs statiques et des arroseurs à impulsions et, en plus, est doté d'un système intelligent qui évite d'arroser des surfaces préalablement désignées. Grâce à son disque programmable, il peut, en effet, suspendre l'arrosage sur certains secteurs de son parcours (angle de maison, une haie, une allée ...).

Exhibit # 7

# Label de l'Innovation Muséographique



## SITEM 1993

*Sous le patronage de*

Jean-Pierre Soisson

Ministre de l'Agriculture et du Développement rural  
Président du Conseil Régional de Bourgogne

Robert Poujade

Député de la Côte d'Or  
Maire de Dijon



*en présence de*

Vincent Courillot

Directeur de la recherche et des études doctorales  
au Ministère de l'Éducation Nationale et de la Culture

Jacques Sallois

Directeur des Musées de France

*le label de l'Innovation Muséographique du Salon International des Techniques Muséographiques*

*a été décerné à XB Pro*

Le Président du Jury

le 19 janvier 1993



# BERNA MULTI-CLAMPS

Dr. Phillip Berna of France is a nuclear physicist, whose hobby happens to be antique repair and refinishing. In his repair experience he found the most difficult task was clamping odd-shaped chair backs or legs, and he set out to develop a clamp that would make his task a simple one.

After six years of research and experimentation he came up with a series of clamps that offer many features that standard cam clamps do not.

The clamps are so well thought out, and can be used in so many ways, in combination with one another, that there are very few clamping tasks that these cannot tackle. These are particularly useful in the repairman's shop where unusual fixes require unusual clamping tactics.

The smaller clamps are known as "Miniatures," and the large ones are known as "Master" clamps.

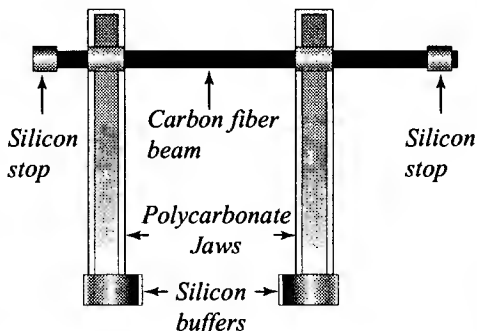
Follow the photo explanations below to get an idea of their many uses:

## Part No. Span & Depth

CLMS	Miniature	2" X 3"
CLML	Miniature	7" X 3"
CL1006S	Connector strip, 12 connectors	

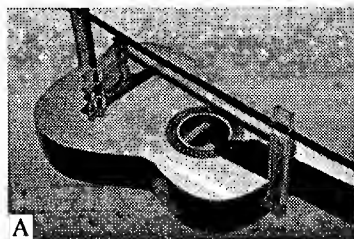
## Part No. Span & Depth

CLPA1	Master	10" X 4"
CLPA2	Master	16" X 4"
CLPA3	Master	10" X 6"
CLPA4	Master	16" X 6"
CLPA5	Master	26" X 4"
CLPA6	Master	26" X 6"
CL1006L	Brass connector, "beam link"	
CL51006C	Coupling collar	

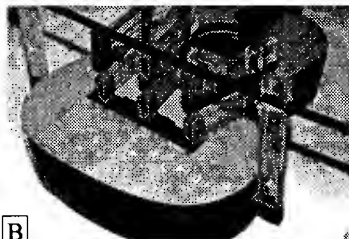


### One word of caution

The similarity in appearance to cam clamps in some ways tends to work against them. Dr. Berna found that typically someone who has used cam clamps in the past expects to use the Berna clamps as they would a cam clamp. But as he explained after many fixes and several conversations, the technological leap is great enough that advice and explanation needs to be well heeded by the user.



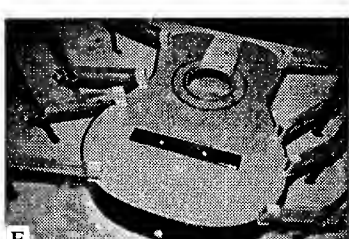
A master clamp with a 26" beam is used as a "bridge" for clamping against. Note that another master clamp is used as a spreader clamp against the bridge.



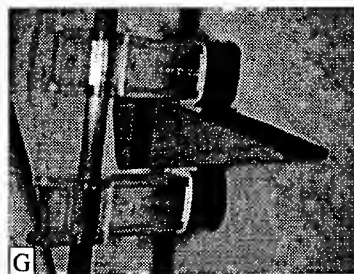
One master clamp is used as a bridge, while three more are used as spreader clamps.



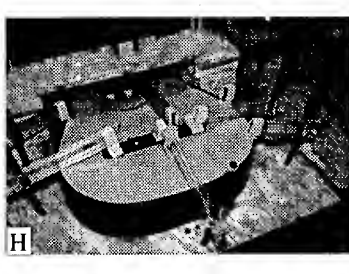
Two master clamps serve as a stop against which a long beamed clamp bears drawing the neck into the body.



By drilling  $\frac{7}{16}$ " holes in a work-board you have a quick and easy hold-down/clamping system.



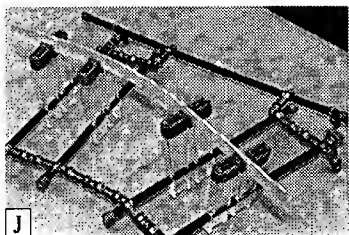
This photo shows another advantage of the Berna clamps. The silicon buffers can conform to unusual shapes, such as this wedge..



Several clamping methods are employed here, from bridge clamping, spreading, and hold-down clamping.



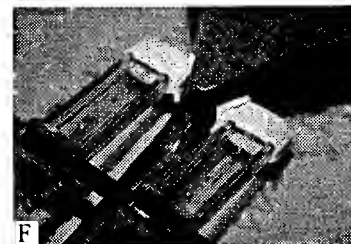
Another example of the silicon buffers ability to conform to and grasp awkward angles.



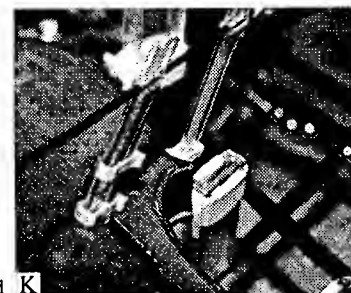
Known as "double collars" the steel connectors can be attached to one another for devising special clamping jigs (multi-point vices).



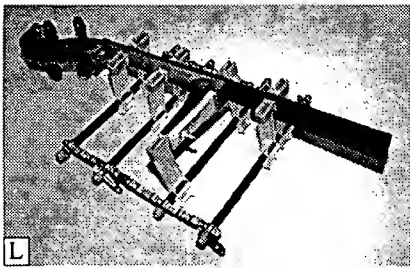
This is a photo of a repair that occurred at the '96 NAMM show. The peghead crack was easily fixed with only the one clamp.



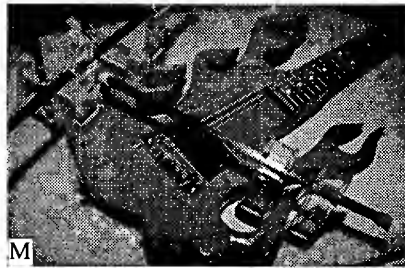
A typical use, which in most cases with other clamps, takes more than one.



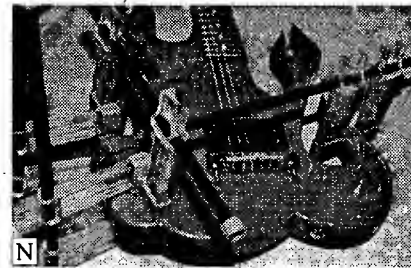
A special use of the miniature clamp: the buffer is moved up the jaw to allow access to the small F-hole.



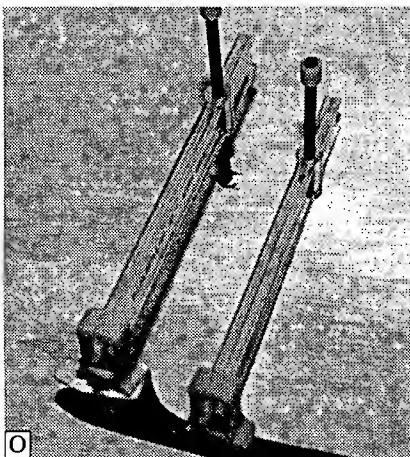
L Coupling collars used for multi-point vice.



M An example of "opposite workpiece" clamping and "angle/bridge" clamping.



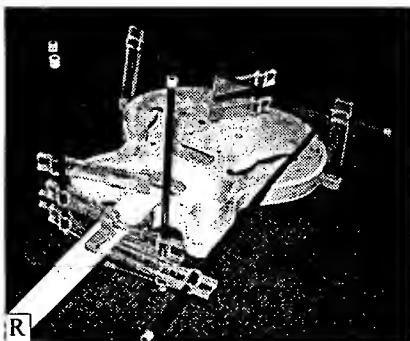
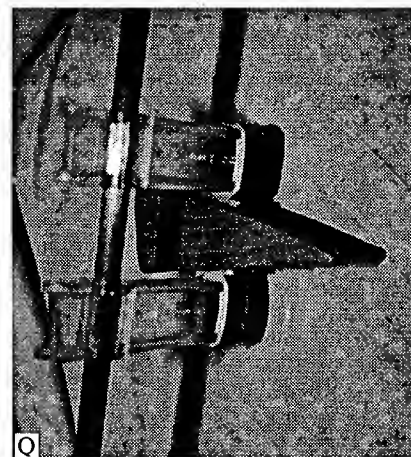
N Another view.



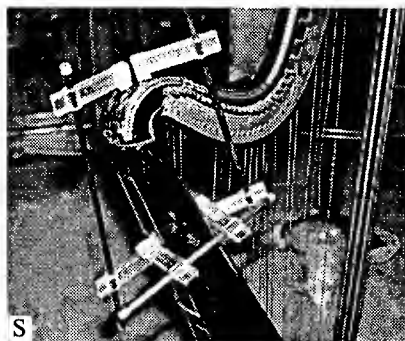
O "Hold-down clamping with miniatures.



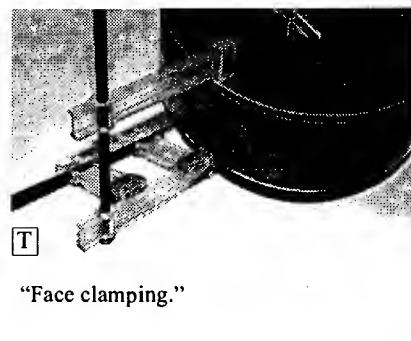
P Compare wedge clamping of cam clamp above to Master clamp, at right.



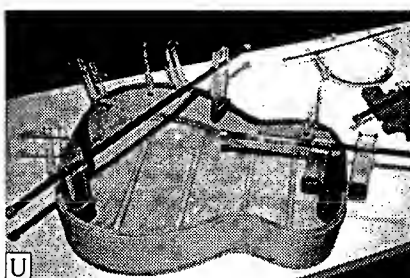
R Examples of several types of clamping



S "Bridging."



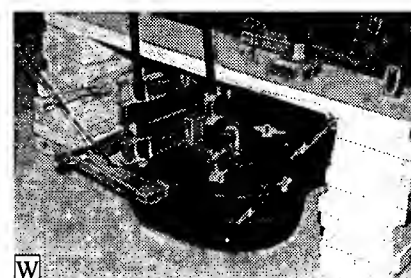
T "Face clamping."



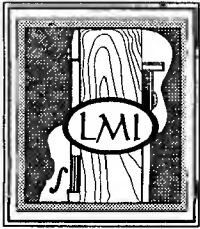
U Miniatures and Masters used for standard clamping tasks, as well as a "spreader." Note "spreader's" ability to clamp the awkward angle.



V "Bridging."



W "Bridging, "spreading," and more.



## LUTHIERS MERCANTILE INTERNATIONAL, INC.

P.O. Box 774 / 412 Moore Lane  
Healdsburg, CA USA 95448  
Telephone: (707) 433-1823  
Orders: 800-477-4437  
FAX: (707) 433-8802  
EMAIL: lmi@lmii.com

### BERNA MULTI-CLAMPS

#### *Miniatures:*

- Ideal for small or fragile clamping projects where up to 11 lbs. of force is adequate. (We suggest that you clamp your fingertip with one of these to get an idea of clamping pressure.) These are made to twist off if the force is too great.
- Beams are  $\frac{1}{8}$ "
- Clamps weigh less than 5 oz.

#### *Masters:*

- For larger scale assembly projects that require up to 200 lbs of force.
- Beams are  $\frac{3}{8}$ "
- Clamps weigh less than 5 oz.

**Directions for use of the Masters** 1. Steady the object(s) between the buffers and slide the jaws together to align around the clamping area. 2. Press the back ends of the jaws just in front of the beam towards the center making sure that they remain directly aligned (only when span between the jaws is below 10") See Graphics 1 and 2. To correct small deviations in alignment, gently tip the Master Multi-clamp beam opposite the direction in which it has a tendency to tip (or use the jaw guiding method set out below). 3. Apply necessary pressure. The force exerted by the hands is about the same as that between the buffers. There is a slight taper cast into the holes of the jaws, so that they automatically jam when the jaws are forced outward. The silicon buffers are supple enough so that they will conform to most contours, as well as compensate for vibrations and gap created by glue drying. 4. To release, slide one jaw tail firmly apart. See graphic 3.

### HELPFUL HINTS

**Jaw Guiding:** Dr. Berna suggests that a straight ruler be held against the side of the jaws as they are guided around the object to be clamped. Although a little impractical in most clamping situations, it gives you an idea of the importance of keeping the jaws aligned. The ruler is kept about halfway between the buffer and the beam and more or less parallel to the beam. Jaw guiding is more useful if the span between the jaws is below 10". Above 10", the jaws may somewhat diverge to avoid any obstacle.

**To get the maximum clamping force:** when the span between the jaws is small press them toward one another as if you were squeezing a lemon. When this span is medium, press and pull as if you were holding a submachine gun. When the span is great, pull with your arms toward each other.

**NOTA BENE:** even firmly locked, a Master Multi-clamp keeps the suppleness of a car suspension for standing up to occasional vibrations (for example, due to power drilling) and to compensate for glue drying gap.

**MAINTENANCE:** When using Master clamps and the jaws slide but do not lock in place along the beam, gently sand beam with fine sandpaper or emery cloth. You can slide the buffers along the jaw to adjust clamping depth. If the buffers do not slide easily, coat the inside with talcum powder. If they (or the stops) slide too easily, soak in detergent.

**Single-hand clamping:** 1. Preparation. Firmly grasp the beam between the hollow and the three last fingers of one of your hands behind a jaw while holding back this jaw with your thumb and your forefinger. Capture the 2<sup>nd</sup> jaw between two stoppers slipped onto the beam so that the span would be slightly greater than the thickness of the object to be clamped. If the jaws are used hanging down with the 2<sup>nd</sup> jaw lower than or level with the 1<sup>st</sup> jaw, only one stopper behind the 2<sup>nd</sup> jaw is enough.

**Single-hand setup.** Pull the beam apart grasped as described above so as to compress the 2<sup>nd</sup> jaw buffer against the opposite face of the object to be clamped. Then push the 1<sup>st</sup> jaw with your thumb and your forefinger towards the object's other face while keeping the jaws aligned. The jaws will automatically jam. To further increase the clamping force, use both hands as suggested above.

**Hold-down clamping:** Slide a stopper and a jaw off the beam. Have a pilot hole with a diameter of  $\frac{13}{32}$ " in your workbench and insert the beam into the hole. Make sure the beam is leaning backwards markedly opposite the buffer, then push on the back end of the jaw towards the object to be clamped. See photos E and H and O.

**Spreading:** After slipping off one stop, reverse the jaws on the beam. Press the back ends of the jaws as you would do for clamping but outwards. See photos A, and B, U and W, graphics 2 and 4.

**Opposite workpiece clamping:** Use three jaws and a beam; two jaws with buffers pointing opposite the buffer of the 3<sup>rd</sup> one. Clamp the workpiece with the two 1<sup>st</sup> jaws while the 3<sup>rd</sup> jaw is pressing opposite the workpiece. See photos M and N, and graphic 4.

**Face clamping:** Whatever the face shape, even if it is hollow, press against it with one jaw of a spreader while the other jaw is forced against the beam of another Master being used as a clamp. This other Master is clamping the sides of the "face." This beam might be replaced by a board or by a series of wedges. Photos B, H, R, T, and W.

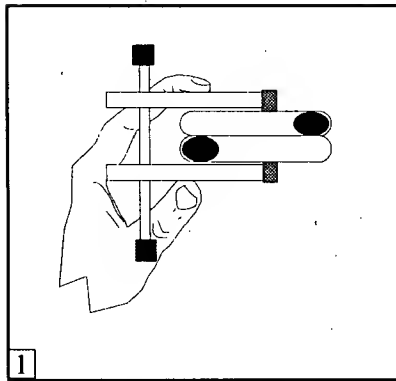
**Bridging:** Consists in clamping Multi-clamps by other Multi-clamps. A Multi-clamp is firmly clamped across a piece and its jaw sides are used as supports for other Multi-clamps which are used to clamp the workpiece itself. See photos D, M, N, R, S, V, and W, and graphic 10.

**For extending Master clamps to maximum span:** Remove both ends of a brass Master connector ("Beam Link," Part no. CL1006L) and slide an end onto each beam being connected. Slide the compression washers onto each end of beam, and slide the beams into the middle part of the compression fitting until they hit the stop. Carefully hand-tighten both ends of the connector until your hands cannot separate the beams. Overtightening might damage the ends of beams. The beams can be extended up to three times in length without losing strength and holding power. For extending Miniatures, loosen both connector screws, slide each beam half way into the connector (Part no. CL1006S) and re-tighten screws. See graphics 5, 7, 8, 9, 11, and 12.

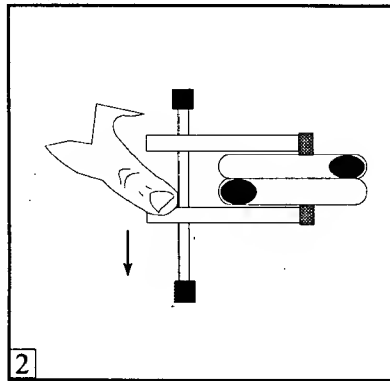
**Multi-point vices:** Special jigs, with span and angle being laterally variable can be built by coupling individual beams with double collars. (Part no. CL51006C). See photos J and L.

**Preparation:** Dry clamp first to uncover any potential problems.

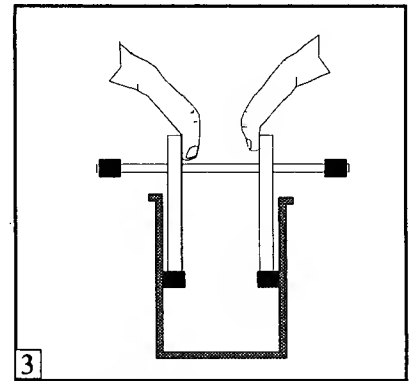
To protect the jaws and buffers against any questionable glue solvent, just coat the jaws and buffers with soap or shampoo. Stepping on a beam might cause damage to its ends. For cutting a damaged end, first make a shallow groove all around the beam with a hacksaw, then completely saw it through. To protect against the occasional graphite sliver from the ends of the beam, keep the stops just covering the ends.



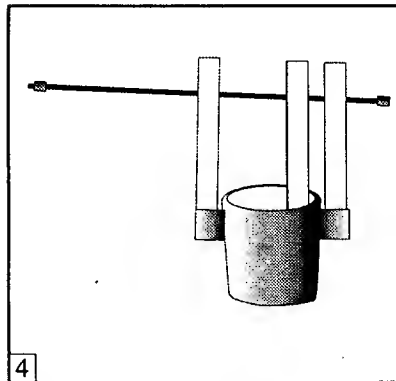
1 Press on the jaw backs, near the beam, toward the object.



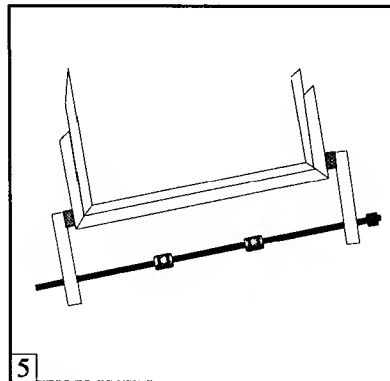
2 To release, press one jaw tail.



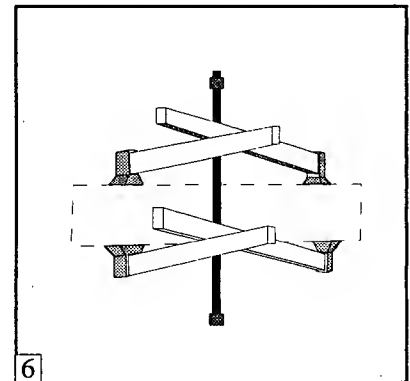
3 Reverse the jaws on the rod, and spread them apart.



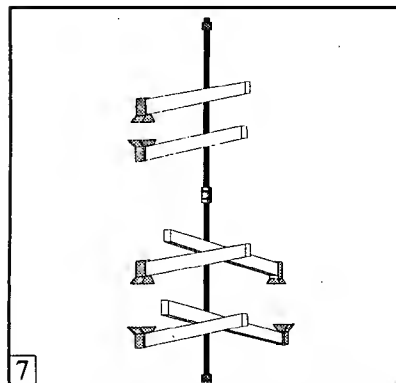
4 Using 3 jaws with one beam



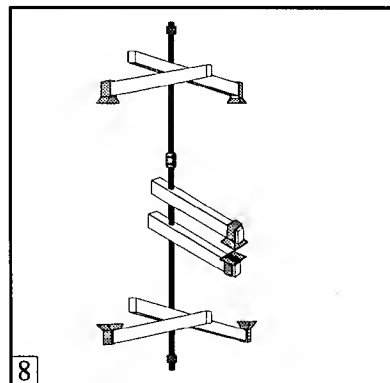
5 When clamping anything like the above, an inside caul with right angle is required.



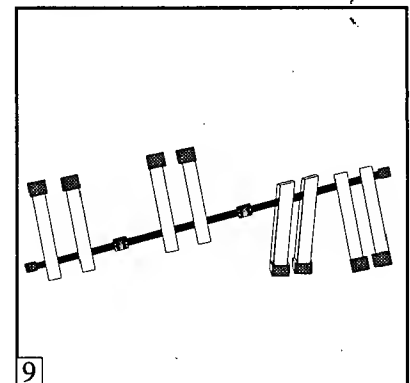
6 Large increase of force, while avoiding obstacle.



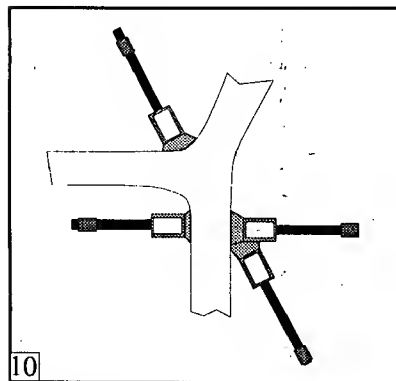
7 Vertical "helping hands." One "beam link" is used. Note two "beam links in #5 above.



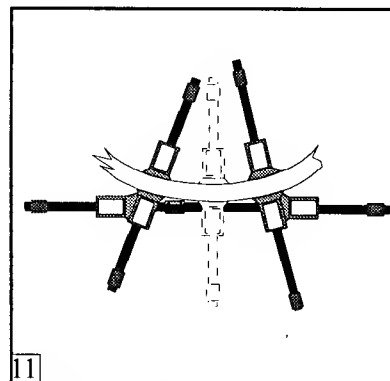
8 To clamp far from the edges, beam link used.



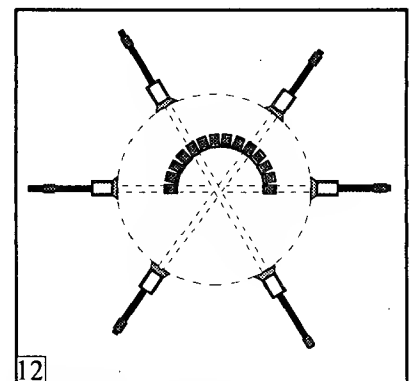
9 Horizontal "helping hands," with two beam links.



10 Angular clamping



11 Clamping any shape



12 Clamping or spreading apart on all sides



Stn. Philippe.

More press coverage from Model Mart, March '94

## ENGINEERING

# The Video Skill Guide to Gas Welding

## with BOC Ltd.,

## and Practical Classics magazine

Produced and presented by Lindsay Porter, the video is based on the use of the BOC Porta Pack Welding equipment.

I passed my welding City and Guilds Welding examination in the 1960s and I have been welding for a living ever since. I must admit to being a little perplexed by some of the advice given. I have no criticism of the safety aspects discussed and would only add that a sense of proportion should always be kept in mind. When welding light structures together, ultra heavy, protective gauntlet gloves have, in the past, hindered my progress. Welding and brazing thin sheet material requires a precise feel which thick gloves can sometimes prevent. Lightweight, thin fireproof gloves are plenty good enough when required in my experience.

**M**embers of the BOC welding team are some of the best welders in the country and maintain very high standards. Welding thin sheet metal is quite a tricky skill to master and the basic idea is introduced in a well balanced and smooth manner.

Cutting operations with small bottles is something which will empty bottles of gas alarmingly quickly, something only to be done in pure desperation. Welding material over 3mm thick is a job for arc welding. The use of the warming nozzle to heat up rusted on bolts is a supe idea and in many cases is

Herefordshire HR7 4DE (0885) 488800/483012.

### W. Hobby Ltd

This company has been in the hobby trade supplying all the relevant materials and tools to model makers for a very long time. I was aware of the company, but to be honest, whilst I have seen their catalogue on sale in the past, I have never had the time to investigate further. On attending the Toy Fair (held at Olympia at the beginning of the year) I looked in at the Hobby's stand and was shown the latest catalogue. It is loaded with useful tackle!

able speed transformer and 10 selected accessories. As well as the drill at a special offer price, W. Hobby also include a free set of Berna Assemblers. These extremely clever devices are some of the most interesting

small clamping units I have ever seen and there is only one word to describe the design concept: Brilliant.

The basic idea is two polycarbonate arms with swivel rubber feet which are mounted on thin carbon fibre rods. The arms slide along the rods then clamp on to the workpiece. The action of the rubber feet and the flex of the carbon rods give a firm and precise clamping action. I understand that all manner of art restoring establishments are using the assemblers on a regular basis. Get some, you won't regret it.

For further information contact W. Hobby Ltd., Knights Hill Square, London SE27 0HH (081) 761 4244.

by Trevor Tennant

'I looked in on the Hobby stand and was shown the latest catalogue. It is loaded with useful tackle! Things like metal cutting fretsaw blades, impossible to purchase locally, are listed as well as many other items I had never heard of.'

the only way things can be undone.

Another fellow on the video demonstrates some typical car/body repairs. He certainly knows his trade. In fact I learnt several lessons from his well informed comments.

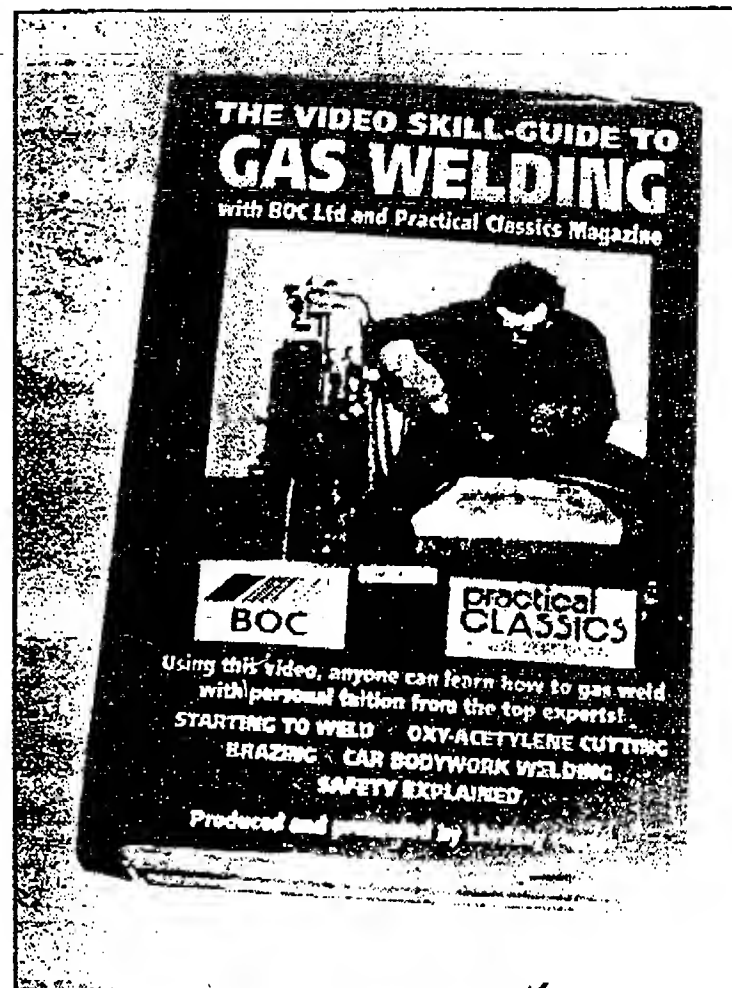
A very useful video to add to your collection.

For further information contact Porter Publishing Ltd., PP Video Products, The Storehouse, Little Hertford Street, Bromyard.

Things like metal cutting fretsaw blades, impossible to purchase locally, are listed as well as many other items of which I had never heard of.

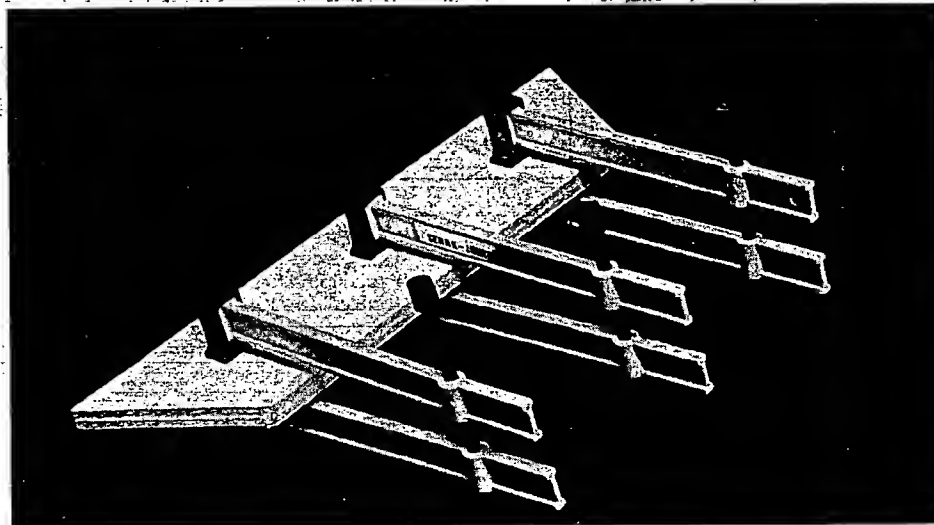
In due course we will be returning to Hobby's to look at the range in greater detail. In the mean time I can draw your attention to their latest offering, the Minicraft MB5001 Variable Speed Drill kit.

This is the latest improved version of the high speed hobby drill complete with vari-



makes the use of needle files almost unnecessary for this task. I bought some more this year. The Tony Abel fin was carefully fitted until its attitude fitted the check dimension given on the plan. This consisted of a distance given between the bottom of the bow plate and a point 320mm down the leading edge of the fin. Once the fin could be held in its correct position some medium card was used to cut and develop the side panel shapes for a wooden finbox to be built in the hull.

the 3mm ply although the cross beams should really be cut from thicker material. My solution was to cut out two of each and glue them together with clear epoxy to produce a 6mm section component. These components were assembled to the underside of the deck, was again using an epoxy/microballoon mix which is finished off with the rounded end of a large 'tywrap' to produce a clean fillet of about 4 to 5mm radius. Part of this operation also involved cutting a circular hole for the

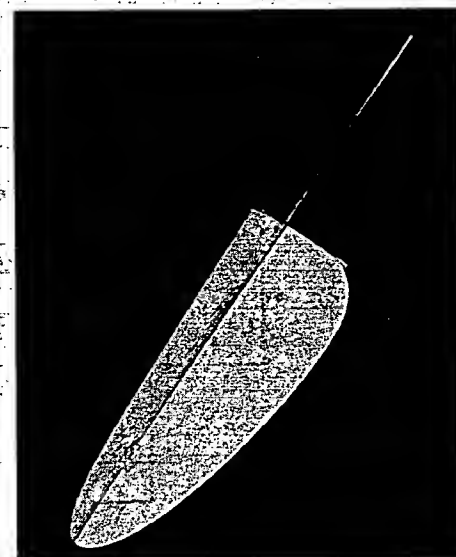


Double thickness cross member being clamped together with small 'high-tech' clamps from France.

These parts and the front and back edges of the box were cut from the 3mm ply. The inside surfaces were given a coating of clear epoxy resin before proceeding any further with their assembly. A seemingly minor point this, but you try ensuring a good coat inside an 11mm wide rectangular tube! Another thing worth remembering is that such pre-treated panels must be abraded and degreased with acetone or similar to get rid of any surface deposit before they are joined using the epoxy and microballoon putty mix.

When cured the four components were assembled using an epoxy and microballoons paste mix to form a fillet in the corners. To hold the whole thing together while curing I used another useful tool acquired at last year's ME. This one was designed and brought to the show by a Frenchman; it is deceptively simple and makes use of a slim carbonfibre rod on which two clamping arms slide. When they are assembled with components as a clamp the angulation of the arms on the carbon provide a secure pressure that is controlled by the bending of the carbon. Because the arms will ultimately slide if the pressure exceeds a certain amount it is impossible to apply too much. Again I went back this year for some more: the large ones will span a One Metre Hull and the small ones are useful for the smaller sub-assemblies.

When completed, the finbox was tacked in position after taking a great deal of care with its alignment and that of the fin: it will be finally taped and resined into place after final fitting of the deck and associated components. It was necessary to fix it into the hull so as to allow to centre section underdeck components to be developed. These were also cut from



Carbon rudder shaft just fits in Tony Abel's wooden pre-made rudder.

radio pot which was reinforced with a couple of layers of 3mm ply.

At this point in the proceedings I had to call a halt to the building to pack in a bit of writing so we will have to wait until next time to look at planning the radio installation, actually attaching the foils and ballast, and making provision for rigging attachment.

#### SHOPPING LIST

The following is a list that I put together recently when considering a new yacht: it is not exhaustive but might be found helpful to the beginners. Also noted are likely sources of these materials.

Hull	Already Acquired
Deck material	Fablon - DIY Store
Structural Deck Material	Plywood
Fin	Tony Abel almost finished wood
Lead Ballast	Sails etc. or Ken Butler
Rudder	Tony Abel almost finished wood
Rudder shaft	Sails etc. carbon
Rudder tube	Sails etc. carbon
Mast(s) & Boom(s)	Sails etc. plain & groovy tube
Gooseneck	Own make - or Sails etc.
Backstay Crane	Own make - or Sails etc.
Sail(s)	To be decided - or Sails etc.
Radio receiver & servo	Already acquired
Tiller	Own make
Winch	Barny Jackson (one of my current units) - or Whirlwind - or Tony Abel
Batteries	Already acquired (600ma AA x 6)
Radio Pot	Sails etc.
Sheeting material	Sea Ranger Dacron Line or similar
Rigging wire	Local dinghy Chandlers - special order
Wire for hooks	Sails etc. or Fishing tackle shop
Miscellaneous Fittings	Sails etc. or Bernie McNulty
Shroud eyes	Fabricated from heavy gauge stainless wire
Deck Pulleys	Own make - or PeKaBe from Sails etc.

#### Addresses

Here are a few useful addresses for your collection:  
 Kits, Sails, Fittings, General Supplies:  
 Sails etc. 141 High Street, Kelvedon,  
 Essex, CO5 9AA  
 Tony Abel, Highnoon, Petersfinger Road,  
 Salisbury, SP5 3BY  
 Swan Models, The Bungalow, New Barn  
 Park, Swanley, Kent, BR8 7PW  
 House Martin, 51 Edinburgh Drive,

Prenton, Birkenhead, Merseyside, L43 0RJ  
 Special Racing Yacht Fittings:  
 MAC Fit, Bernie McNulty, 1 Lakeside Court,  
 New Brighton, Wirral, L45 1NS  
 Cast Lead Bulbs:  
 Ken Butler, 10 Leaholme Gardens,  
 Stourbridge, West Midlands, DY9 0XX  
 Winches & Special Servos:  
 Whirlwind Winches, 49 Aberdale Road,  
 Leicester, LE2 6GE

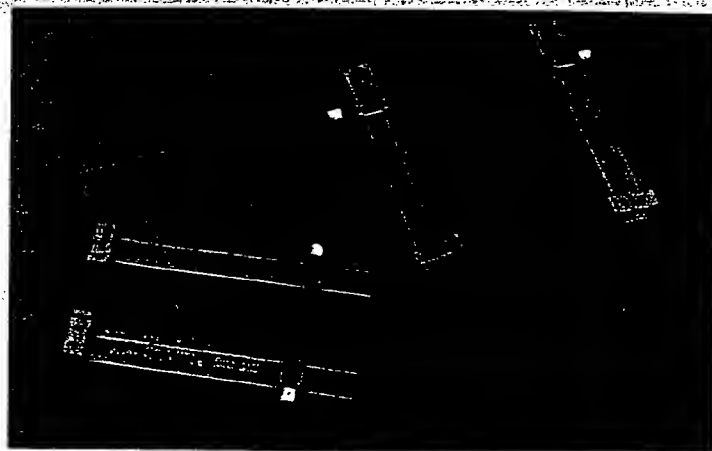
## XB Pro

Another new name to MMI and manufacturers of a very useful bit of kit. XB Pro produce 'Berna Assemblers', a unique type of model clamp that come in a range of sizes, allowing you to tackle the smallest and most fragile clamping job to the largest assembly task.

These simple clamps consist of a carbon fibre beam with a silicone rubber stop either end and two polycarbonate jaws, each with a silicone buffer. Simply slide the jaws up to the item you need to clamp, slide the silicone rubber stops up to them and hey presto it's clamped.

Although initially sceptical of such a simple approach to the relatively complex job of clamping, field tests conducted building a variety of models, from small aircraft to large figures and AFVs, proved the Berna Assemblers worth. They're easy to use and do the job well, the only area where they're perhaps not as competent as more traditional clamps is where you need to apply a lot of pressure. Most of the time they'll work, but depending on the shape of the component they can sometimes be tricky to position and keep in place.

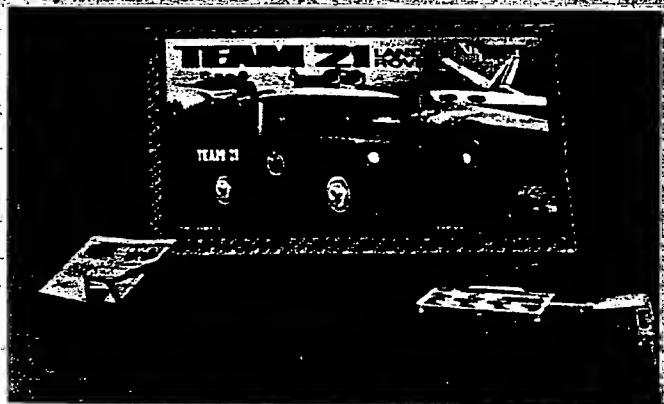
As simple and effective clamps for most modelling tasks the Berna Assemblers are certainly made for the job. For further details contact: XB Pro, 41, avenue Saint-Jean, 84000 Avignon, France. Tel/Fax: +33 (0)4 90 85 90 81.



## Monti System

The Monti System are a range of around 50 clip-together kits produced in the Czech Republic. Apparently not a new range, the Monti System have until recently just not been available over here in the UK. The Muddy Trax, 474 Centre of Surrey, primarily on the basis of the Land Rover kits within the range, recently became sole UK importers for the range. Militarily on the Komando Land Rover, CS Armada, Iatra 815 Truck and the MB Unimog 1300L will be of interest to readers of MMI. However, I can report these kits are a pleasure to build with no adhesive required and component parts from various kits being fully interchangeable. Mouldings are in various colours so no painting is required and the decals are of the cut out and stick on variety. Recommended for children from the age 6 upwards. I wouldn't hesitate to recommend these interesting kits to the newcomer, after all we need to capture a youngsters' imagination right from the word go and what better way to do it than with these simple to build kits.

Monti System kits retail from £5.50 and are available exclusively from Muddy Trax on 01252 717922.



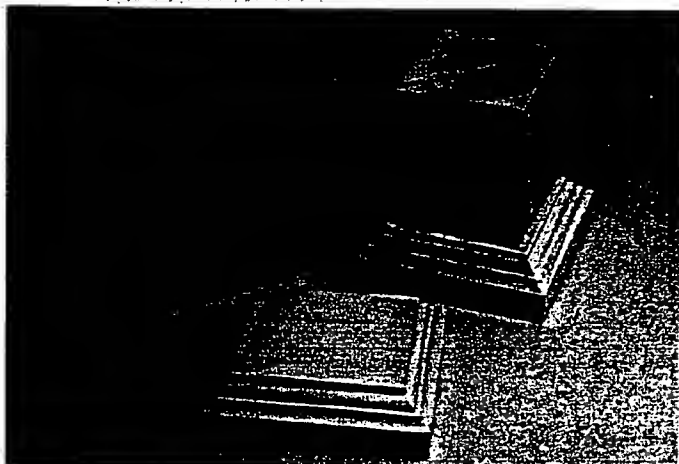
## Oakwood Studios

Oakwood Studios have sent along a selection of their wooden bases for us to take a look at. Amongst those shown are various turned bases and a turned plinth, ranging in price from £4.30 for the Mahogany turned plinth to just £1.25 for the 45mm dia Mahogany turned base.

We also received a selection of square bases and plinths. These ranged in price from £4.90 for the 70mm high plinth in Yew to £1.50 for the 60mm square base, again in Yew. We've only shown a small selection of the popular bases available from Oakwood Studios, a wide range of other bases in different shapes and styles is also available. Of course if you can't find the base you want they will be more than happy to quote you for bases to your requirements.

Although we didn't have time to get a photograph for this issue, Oakwood Studios also sent along one of their latest acquisitions. Sculpted by Mike Blank, Richard The Lionheart is a 120mm resin figure that retails at £23.50.

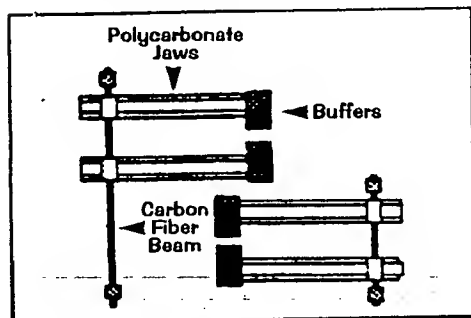
For further details contact: Oakwood Studios, 396 Ring Road Beeston Park, Middleton, Leeds, LS10 4NX. Tel: 01132 719595.



# Berna Assemblers Versatile Clamping System

by Richard A. Young

One of the most interesting new products I have encountered is the Berna Assemblers clamping system. Their design is completely different from anything else on the market. My salivating over them drew the attention of Barbara Heilweil, advertis-



ing manager for Zona Tool, exclusive distributor for Berna Assemblers. She kindly forwarded an assortment package containing two large master assemblers, a smaller hobby assembler, and connectors.

Master Assemblers withstand 200 pounds of force before twisting off, while the hobby version resists 11 pounds. Both consist of a carbon fiber beam on which two polycarbonate rods slide. The smaller clamp has a 3" long by 1/8" thick beam and two 3" long rods with soft, rubber jaws, while the larger one has an 8" long by 3/8" thick beam. It can be configured into four sizes 13" or 19" long beam with two 4" long rods, or 13" or 19" long beam with 6" long rods.

Rods can be switched from one beam onto another to customize a clamp for a particular workpiece. Even though the beam looks as though it could get in your way, the rods slide easily along it, enabling

the beam to be positioned where it won't interfere.

Such lengths, combined with their versatility, give these clamps unprecedented size capacity. They can span the width of a fairly robust ship model hull, making it possible to clamp from starboard to port. Better yet, hull and ceiling planks can be clamped to about the turn of the bilge because of the Assembler's long reach. After that, the angle becomes impossible for any clamp. Internal clamping is possible because the rods can be easily manipulated to exert outward pressure as well.

The Berna Assemblers work on the friction grip concept. Jaws are positioned against the plank and hull, then gently squeezed together at the tail of the rods for an external hold, or pushed apart for an internal hold. This clamping system, which handles like a wet noodle until it's locked into place, requires dexterous fingers. Using the Assemblers reminded me of learning how to eat with chopsticks, but rest assured, the clamps are easier to master, even if you don't have nimble digits.

The force exerted on the tail of the rods is about the same as between the buffers on the jaws. Too much pressure will dislocate them, but it doesn't take long to figure out how much is enough. This is a big boon, for when fingers determine how much force to apply, there is never any fear of breaking fragile assemblies. Furthermore, the flexible buffers grip all shapes within reason. They'll even hold an egg!

When the glue sets, a simple twist of the fingers on the tail of the rods loosens the jaws. The whole system can be manipulated single-handedly with a little practice. That is a decided advantage if you've ever struggled to hold several pieces together with one hand while fum-

bling to adjust a conventional metal or plastic clamp with the other. Their lightweight construction won't distort fragile assemblies, yet the clamps are tough enough to withstand crashes to the floor and other klutzy moments.

The connectors that came in the package extend the width the Assemblers can open by joining beams end to end. They also allow pressure points. (All components are available individually.) One of the beautiful things about the Berna Assemblers is their simplicity of construction. Why didn't I think of this wonderful method?

Zona Tool Company is the exclusive distributor for Berna Assemblers. To locate a retailer near you, call (800) 696-3480. FAX: (800) 299-4208.

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Each set of signs is available in N and HO scales and retails for \$2.00. Extra wooden posts are available at 20 for \$1.00. Plastic scale 3" round sign posts are 20 for \$1.50. Any Blair Line Sign can be ordered assembled for an extra charge.—JIM PORTERFIELD

#### Berna assemblers: All scales

Distributed by Zona Tool Company, Bethel, Ct 06801.

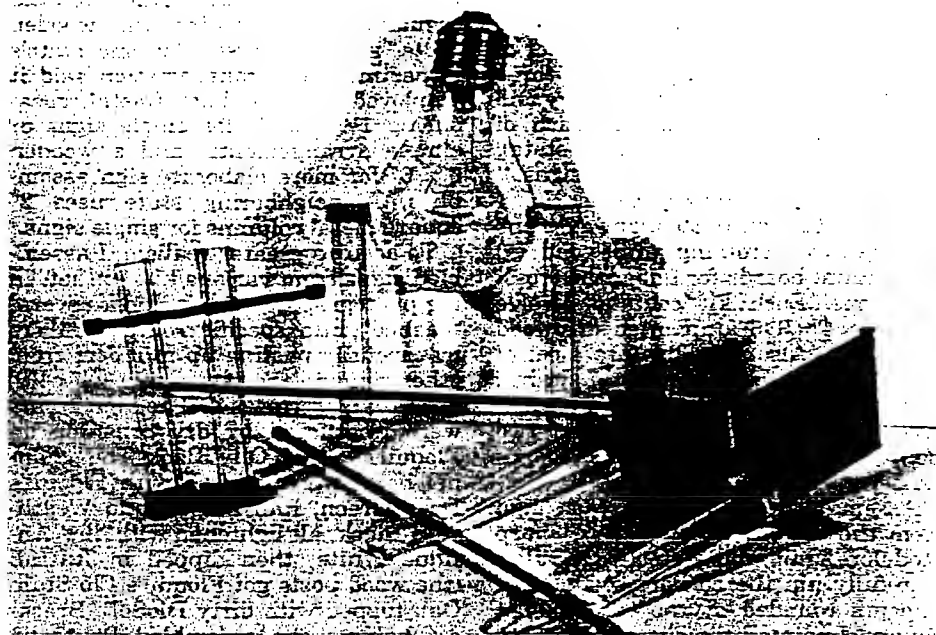
With woodworking and HO trains for hobbies, I know the value of having a variety of clamps for gluing. My collection includes C-clamps, spring clamps, bands, and pipe clamps both large and small. For woodworking you want heavy, metal construction designed to apply untold amounts of force to the two surfaces being glued together. This force is great when gluing a table top, particularly if the boards are warped. But such brute force is disastrous for model work. Yet most clamps designed for model work follow woodworking designs, only on a smaller scale.

In the search for something that does the job, modelers have turned to all kinds of Rube Goldberg contraptions using clothespins, rubber bands, etc. Yet I have found even the force produced by a clothespin can be too much for delicate hobby construction. Those beautiful miniature brass bar clamps can destroy a model with their own

weight, not to mention the excess force they allow to be produced.

Now, there is a new kind of lightweight clamp designed for delicate model work. Berna Assemblers distrib-

uted by Zona Tool Company, famous for the Zona Saw, are just the thing modelers need. Patterned after the 30 pound pipe clamps hanging in my garage, these super lightweight units provide



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that soft touch needed when edge gluing scribed siding or attaching a surface mounted detail. Weighing only half an ounce they provide a maximum of 11 pounds of force.

Berna Assemblers are made from the latest in strong lightweight materials. The jaws are polycarbonate, the material invented by GE we know as Lexan. This stuff is almost impossible to break. You may know it as the unbreakable store glass you buy at the lumber yard or the covers over the stain glass windows at your church or synagogue. The beam or "pipe" is made of carbon fiber. It flexes without breaking, just like those expensive fishing rods. The clamp faces are covered with a very soft silicon pad which will not harm any surface, yet provides a "grip" when needed.

Berna Assemblers are very easy to use. They are designed for one handed use. Simply slide the jaw along the "pipe" until contact is made. Apply gentle pressure to the jaws, near the beam, to squeeze the two faces together and you have just the right amount of pressure. To release, simply slide the two jaws apart, again at the beam. It only takes finger pressure.

The flex of the carbon fiber rod creates just enough tension to hold the jaws in place, until released. The jaws can be slid off the beams and reversed

so clamping force can be exerted outward instead of inward.

The package I have contains three clamps, two 3" in length and one 8" long. Also included is a strip of electrical screw terminals that can be cut apart and used to connect the beams together to form longer clamps. An instruction sheet includes many photos and hints. Clamps and parts are also sold separately.

I have tried these clamps on a variety of projects. The only trouble I had came when I applied too much pressure. The ability of the jaws to twist on the beam, plus the non-stick surface of the silicon pads, will allow the jaws to slip when too much force is applied. I have the same problems with my large wood-working pipe clamps also.

It is simply a matter of careful placement and not clamping too hard. It is also a nice safety feature, for delicate models are no longer in danger of be crushed to death.

Note in the photo, one clamp holds a lightbulb, a simple experiment to show how delicate the clamping force of these Berna Assemblers is. I have found these clamps be a versatile addition to my workbench, and keep them there all the time. The price for the mixed package is \$16.95; \$4.95 for the 3" and \$5.95 for the 8" clamps.—DOUGLAS HARDING

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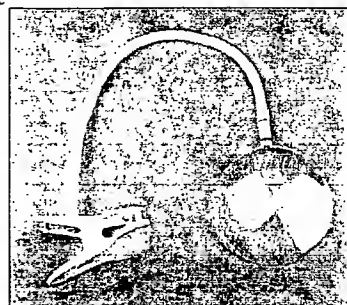
by Paul Lawson

Volume 4 Issue 12. December 1998 £2.50



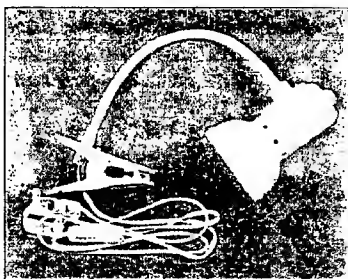
## Magnifier and light for modellers

Salamander offer a number of light and magnifier units which will be of great use to modellers.



Flexy Magnifier

• The first product is a flexible magnifier unit. This unit offers a large 6 inch diameter magnifier lens that is mounted on a flexible stem, which is in turn secured to a large plastic clamp. The unit



Flexy Daylight Lamp

can be clipped to most work surfaces up to a thickness of about 3 inches (75mm).

The second unit is a flexible light unit. This is similar to the magnifier mentioned above, with a 20cm flexible arm and the plastic clip. The light unit itself will take a screw-threaded 40 watt 'Daylight' or standard (R80) bulb and there is 2.5m of cable with a 13amp plug attached. To control the light there is a single toggle

switch positioned mid-way along the cable, therefore alleviating the need to touch the actual light shade.

The final version on offer is a combination of the above two items in one. The flexible magnifier and light unit are mounted to a single clamp and the only change from the single magnifier is that the flexible stem on this example is shorter (about 20cm). The fused plug and toggle switch for the light are included and the light will accept the 40 watt bulbs mentioned above.

Each one of these items will be of great use within the workshop and the use of 'daylight' bulbs within the light unit will be better for those of us that slave into the small hours in the modelling 'den'!

Each of the above retails as follows within the UK:

Flexy Magnifier £27.00

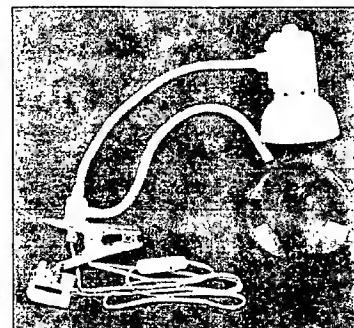
Flexy Daylight Lamp £30.00

Flexy Daylight/Magnifier Lamp £57.00

(These prices include VAT and UK carriage.)

Salamander are also actively looking for wholesale/retail distributors for these products.

Our thanks to Salamander for the review samples.



Flexy Daylight/Magnifier Lamp

### Information

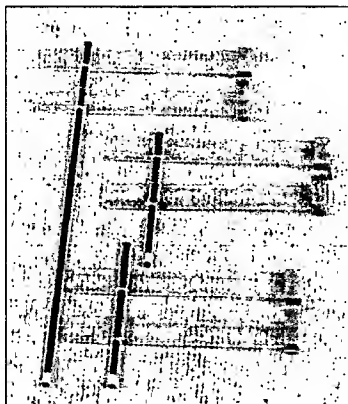
#### Manufacturer:

Salamander Ltd, Troy Industrial Estate,  
Sambourne, Warks B96 6ES  
Tel: 01527 892986 Fax: 01527 893310

## Clamping system from France

One of the most difficult areas in aircraft modelling is clamping parts together while the glue dries. I am sure we have all tried clamps, clips and no end of other things, but these new Berna Assemblers from XB Pro are a little different.

The first thing that will strike you is the total lack, it would seem, of actually clamping them onto your model? Basically each clamp is a set of plastic arms with rubber grips on one end, attached to a rod at the other. How you use them is to put them onto the piece you want to clamp and press the ends of the arms together. The arms move in at the base, on the rod, and this locks them onto it. This small twisting of the arms ensure that they do



Three of the Berna Assemblers from XB Pro

not move, as well as exerting the correct amount of pressure onto the model.

Each clamp is made to the highest quality, the grips are silicon rubber, the arms polycarbonate and the rod is carbon fibre. Breaking them should, therefore, be very difficult and you will be amazed just how useful they are once you start using them. I cannot recommend them highly enough and the proof of the concept is that I have already purchased these clamps myself long before we received these examples as samples!

The clamps are also very adaptable. Because the arms come off the rod, you can turn them around and get grips that work outwards. This allows them to be used to hold parts or assemblies while you paint and spray them. On top of this you can use the clamps in a mass of

combinations to exert pressure in a number of directions at once. The possibilities are endless, and the system is versatile that you'll be amazed how much you use them.

I believe that there are a number of tool specialists that stock this clamping system in the UK, but anyone wanting to know more about them should contact the manufacturer at the below address.

Our thanks to XB Pro for the review samples.

### Information

#### Manufacturer:

XB Pro, 41, avenue Saint-Jean, 84000  
Avignon, France  
Tel: +33 (0)4 90 85 90 81  
Fax: +33 (0)4 90 88 32 03

## Bare-Metal Foil Range

Many of you I am sure will already know of this firm, but for those of you who don't, they are an American company that produce adhesive foil, tools and decals.

their toolbox and at the new low price of just \$9.95, it's excellent value as well.

The other product for which Bare-Metal Foil is known is, surprise surprise, adhesive



PS-3 the panel scribe

One of the best little tools created by this source is their panel scribe. This (product PS3) is unlike a number of other such tools on the market, in so far as it does not cut a channel in the plastic and thereby leave a ridge on either side. In fact it works by removing a tiny sliver of plastic. This means that the scribed panel line is identical to those created in injected kits and there are no unsightly ridges or the need to 'clean up' the scribed area with wet'n'dry.

This is an excellent product and one that all modellers should consider adding to

foil! The range has many uses and consists of various different types of foil as follows:

Chrome  
Gold  
Matte Aluminum  
Black Chrome  
Ultra Bright Chrome

Each packet contains a 15.5cm x 29.5cm sheet of the foil, attached to a backing sheet. Now all bar the 'Chrome' finish examples will purely (we suspect) be used for finishing a product. Exhaust pipes, intakes



The range of adhesive foils

and any number of areas can benefit from this product. Careful use of this foil will result in effective bare metal finishes on aircraft and as the foil can be over-sprayed you can always tone down or tint the foil once applied. The chrome and matte aluminum effect foils have a number of other uses (although you can use any of the others as well) and these include reproducing metal under paintwork, which

can then be chipped off to replicate wear, or using as masking for complex canopies. The foil will always bond well on a clean surface and therefore, as it is cut and produces a hard edge, your canopy frames will be nice and sharp. Strips of the foil can also be used to reproduce the edges on certain canopy frames, or metallic strips anywhere on an airframe, vehicle, etc. The foil can also be used to create seat harness on aircraft seats or ejection seats in any scale, as you can cut it to width.

Overall, the Bare-Metal Foil range is excellent and one of those products that has a mass of uses, not just those it was originally created for (namely that of trim on vehicle models).

Our thanks to Bare-Metal Foil for the review samples.

### Information

#### Worldwide Enquiries:

Bare-Metal Foil Co., P.O. Box 82,  
Farmington, Michigan 48332, USA.  
Tel: 248 476 4366 Fax: 248 477 0813

Exhibit #16

### SMALL PARTS PICKUP

#### **WIRE PRONG HOLDERS**

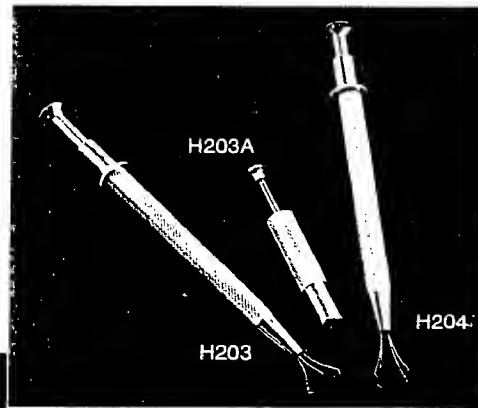
Pickup the smallest objects with these handy 3 and 4 prong holders. Great for picking up small parts, for positioning and painting and getting into hard-to-reach spots. Length: 4-5/8" opens to 5/8" diameter.

#### **H203 3 PRONG HOLDER**

#### **H204 4 PRONG HOLDER**

#### **H203A 3 PRONG MINI-HOLDER**

All the features of the H203 but only 2-1/4" long!



### HANDS FREE HOLDERS

#### **H200 THE THIRD HAND**

6-1/2" long, cross-locking tweezers (H500), mounted on double ball joint assembly. Base is heavy iron. Tweezers featured on page 21. *See 20 behind*

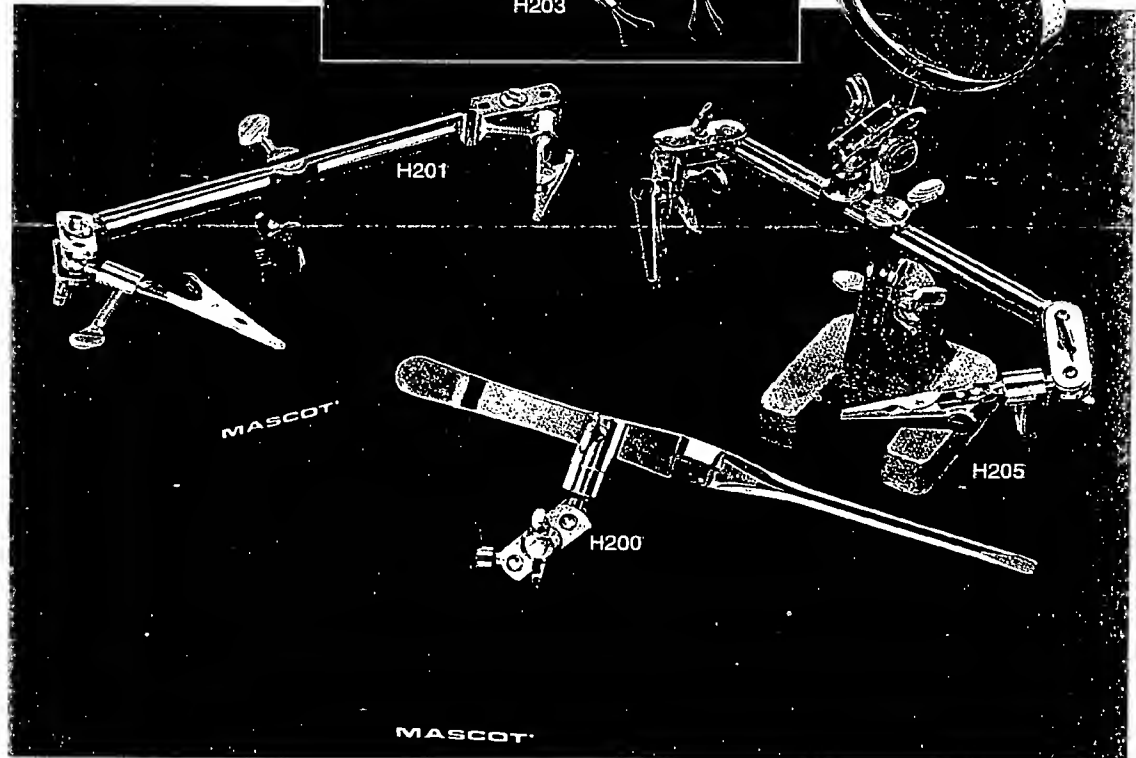
#### **H261 TWIN GRIP**

Has two alligator-type spring clamps, mounted on ball joints for flexibility and tightened with wing nuts so that they stay in position. Cross bar and clamps can be removed and replaced with tweezers. Cross bar 5-1/2" long (exclusive of clips). Heavy base gives no-tip stability.

#### **H205 TWIN GRIP**

#### **WITH 2X MAGNIFIER**

All the features of the H201 with a 2X glass magnifier attached. Ball joints permit positioning of clamps and magnifier at any angle. Center bar can be removed and replaced with H500 cross-locking tweezers.



### HEMOSTATS

Versatile as super slim needle nose pliers, heat sinks, fuel line clamps or vises. Three-position ratchet allows setting degrees of clamp pressure. Polished stainless steel construction.

### STRAIGHT

#### **H340 KELLY STYLE**

Straight, coated handles, 5-1/2".

#### **H342 KELLY STYLE**

Straight, 5-1/2".

#### **H344 ROCHESTER STYLE**

Straight, 6-1/4".

### CURVED

#### **H341 KELLY STYLE**

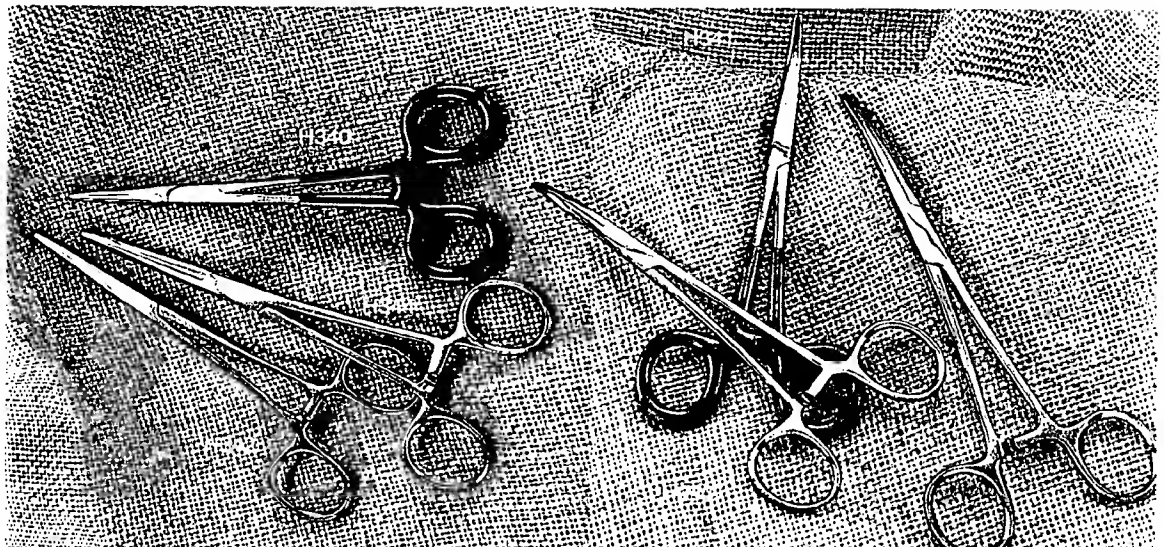
Curved, coated handles, 5-1/2".

#### **H343 KELLY STYLE**

Curved, 5-1/2".

#### **H345 ROCHESTER STYLE**

Curved, 6-1/4".



# Tweezers

## HOLDING AND FASTENING TWEEZERS

Our holding and fastening tweezers allow the hobbyist to free up one hand for positioning, gluing or painting. All are made in our New Hampshire plant of the highest quality nickel plated steel.

### **H500 CROSS-LOCK TWEEZERS, 6-1/2"**

Serrated, blunt tips. Great for assembly or soldering when a clamp is too large. Self-closing tips provide the right amount of tension to hold articles firmly.

### **H509 CROSS-LOCK TWEEZERS, 4-3/4"**

Same cross-locking mechanism as the H500 except with a shorter length for close quarters and pointed, smooth tips for picking up and holding smaller items without marring.

### **H504 SLIDE-LOCK TWEEZERS, 5-7/8"**

Slender, rounded, serrated tips. Slide-lock keeps points closed to hold small parts.

### **H507 SLIDE-LOCK TWEEZERS, 4-3/4"**

A smaller version of the H504, this compact model features sharp, smooth points.

## CURVED TWEEZERS

Mascot® offers 3 varieties of curved tweezers. Each helps the hobbyist get to those hard-to-reach areas, while providing a less obstructed view of the object. All are made in our New Hampshire plant of the highest quality nickel plated steel.

### **H510 CURVED TWEEZERS, 6-7/8"**

Our longest curved tweezers reaching almost 7" with extra long, pointed smooth tips and large finger pads for sure grip.

### **H505 CURVED TWEEZERS, 6"**

Traditionally styled curved, sharp pointed, serrated tweezers with fingertip ribs for sure handling.

### **H508 CURVED TWEEZERS WITH PIN, 4-1/2"**

These sharp serrated points are kept straight and on track by the alignment pin when manipulating small parts. Fingertip ribs along the holding area ensure precise control.

## RETRIEVING TWEEZERS

We offer the most popular selection of tweezers for retrieving small parts in otherwise inaccessible locations. U.S. made, in our New Hampshire plant, of the highest quality nickel plated steel.

### **H520 RETRIEVING TWEEZERS, 8"**

These extra long tweezers are the perfect tool for getting to the farthest reaches while still maintaining absolute control. Features include round, serrated tips and fingergrrips to ensure a firm, non-slip hold.



### **H512 RETRIEVING TWEEZERS, 6"**

The right size for many jobs. All the features of the 8" (H520) in a more compact length.

### **H511 STRAIGHT TWEEZERS, 7"**

The extra long slender shanks are 2-3/4" and taper to sharp, slightly round, non-mar tips. Large, flat gripping area provides comfort and control.

## PRECISION TWEEZERS

Every hobbyist needs a small pair of extra sharp precision tweezers. The strong, sharp points are used where delicate control is a necessity and smooth tips prevent damage to your work.

### **H506 SHARP POINTED TWEEZERS, 4-3/4"**

Sharp points, light tension, beveled and tapered shanks combine to give the precision and accurate control preferred by hobbyists and professional craftsmen. Made in our New Hampshire factory.

### **H501 FINE POINTED TWEEZERS, 4-1/4"**

Beveled and tapered shanks provide accurate control of points for sorting, holding, probing, etc. These are light-tension tweezers with finely honed, needle-sharp points. These tweezers are manufactured in Switzerland of nickel plated steel.



# MASCOT®

M997

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